



Hawkshead Designs Ltd



Version 4.0 Part 2

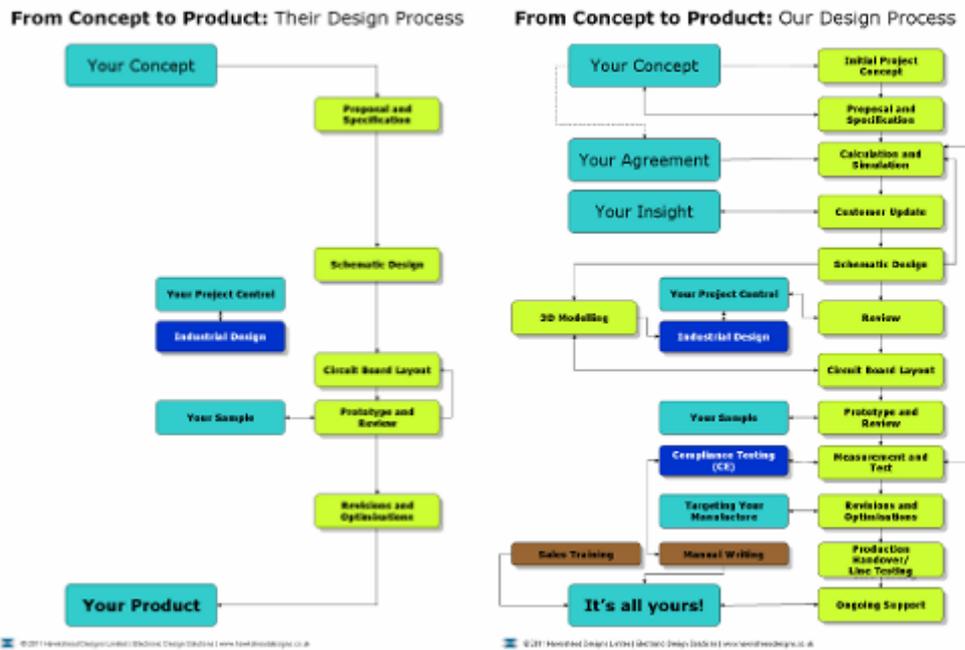
World Class Electronic Design Part 2

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3. Your part in our design process

Comparisons are generally odious. However, internet users are presented with many forms of comparison (price/insurance/features) so as to differentiate the offerings. It's only on that basis that the following is shown:



Said tongue in cheek... "Our design was OK but the project failed because our client didn't agree and we didn't ask them!"

You, the client, are the beginning and end of the design process. Our experience and processes ensure that it operates that way. Too many design offerings on the market support the "nuts and bolts" of the electronics with limited opportunities to share in the deliberations and reviews.

Your project is a focal part of your current or future business. To that end, electronic design is a translation process. If you are comfortable and conversant with the technicalities, then we can start from that point. Many of our clients are either not at all comfortable with the workings of electronics or feel that they are somehow lacking. No one is lacking in the same way that no one knows everything either.

It is very important to us that you have the security of recognising that your design is being handled as you want it. At Hawkshead there are no "silly questions" – we all have knowledge in different areas. Even the simplest question is not simple if you don't have the answer. We are here to provide answers and leave you empowered.

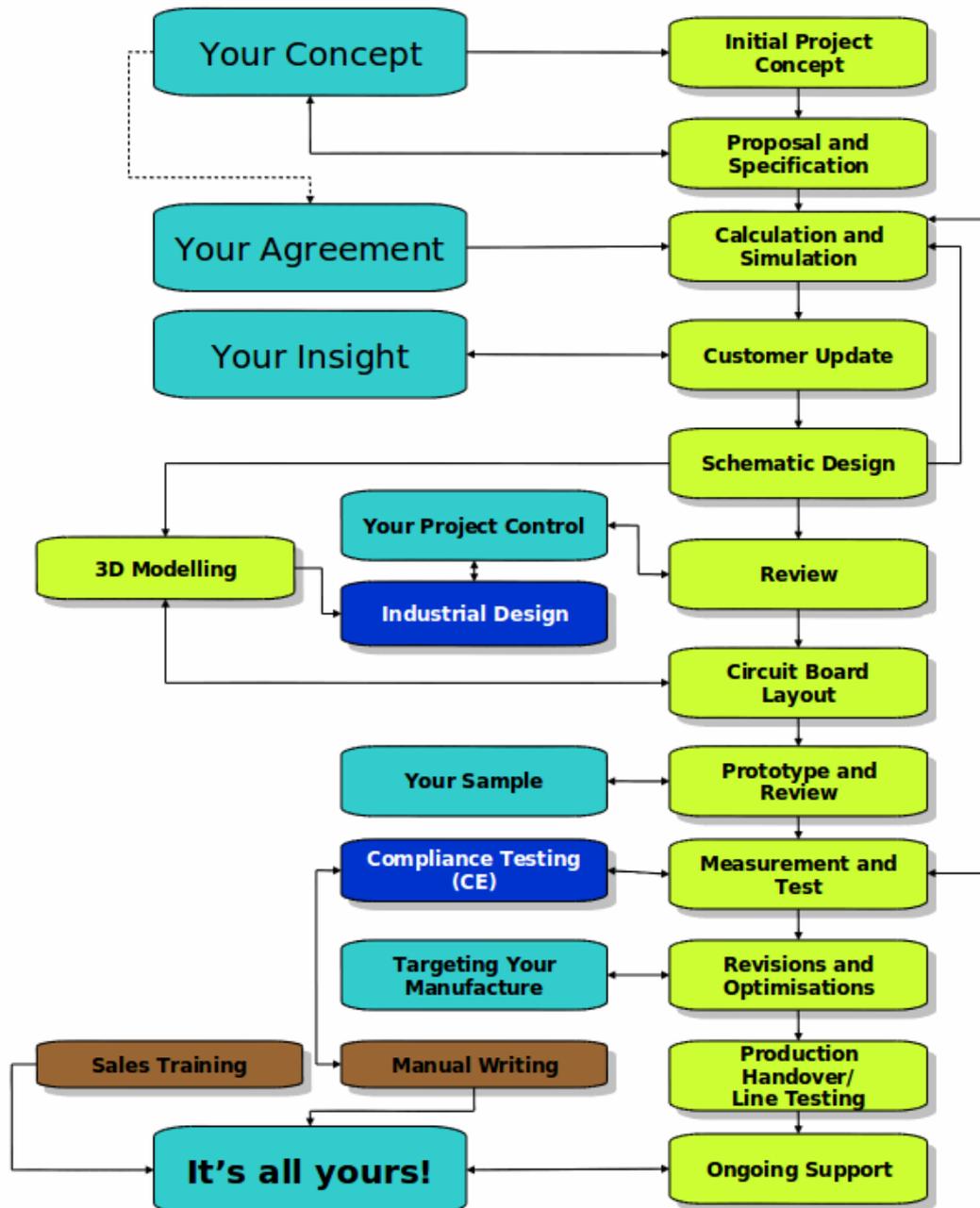
4. Stages



A general description of the design stages is set out in the following pages. If your company has extensive design resources, you may be familiar with the basics. Please understand that a significant proportion of our clients are not technically experienced and require explanation in easy terms.

Sections 5-8 will be of interest to you all.

From Concept to Product: Our Design Process



4.1. Initial concept

Before we do anything we sign a Non-Disclosure Agreement (NDA) with you so that your idea is protected.

Then we discuss your idea extensively with you to discover what you want to design, how you envisage it working and to understand what your aims for its production are in order to form the Initial Project Concept.



Given time, for which we do not charge, to just think about your aspirations, it is quite common for us to come up with a novel approach that places you in a strong position in your market.

4.2. YOUR Concept and Agreement

The early stages of our mutual involvement are about understanding your business, its context and future aspirations. This is encapsulated in the proposal and specification or your scope document. There is no absolute need for a scope document as we define in our quotation process but we are happy to work with one if it is available.

The outcome of our discussions results in a proposal (with specification) and quotation. This is a flexible process such that you can review and modify the requirements. Once we have agreed the proposal is a fixed price quotation for the scope of work involved. It is almost a given (with one unusual exception) that once we have quoted, we do not come back and ask to change the quote even if there are minor amendments along the way. Part of this is due to the way our process is managed.

4.3. Proposal

More discussions between us will take place until we have perfected our proposal for you, which will include a detailed technical specification of how your project will progress and a full and clear breakdown of the project milestones and associated Fixed Price cost of the project.



4.4. YOUR Insight

Some projects have well defined start and end points, in which case the review process is simple. Others have realms of technical risk, commercial feasibility or fundamentally "is this going to work well this way?" Our early stages answer these questions and give practical routes to one or more solutions.

You are the expert in your field or project. We provide feedback to you so that you can offer your insight. The outcome of whatever we do has to fit with your plans. If there are decisions that require balance (e.g. product features vs. unit price) then we discuss them with you. In many instances we make provisions for designs to be scaled up or down to tailor to different price structures or models.

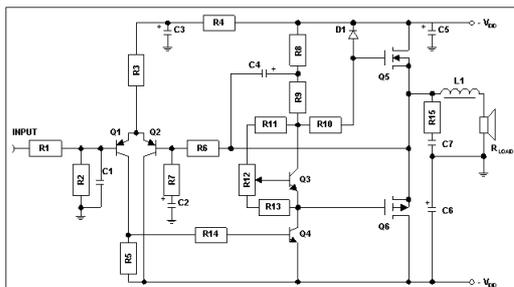
Some design cultures only ever focus on the singular product/project in hand. This means that future requirements are either excluded or expensive. Where appropriate, Hawkshead tends to design for "a family of products". It does not cost any extra at this stage and leaves a multitude of options for later... All it requires from us is an imaginative thought process.

4.5. Simulation

Once you give us the go ahead for the project, the first technical stage is often Simulation, although sometimes this isn't necessary.



We carry out simulation to assess likely performance and trap any potential errors at an early point in the project, before moving to more costly stages. We discuss the results of the simulation with you and make any agreed changes to the specification as required.



4.6. Schematic design

The next stage is to complete the schematic design. Schematics are the "road maps" of electronics. In Computer Aided Design (CAD) this process includes considerable data input to assist the accurate execution of the project and tracking of parts. The Schematics are reviewed with you so that any feedback from you is discussed and considered.

4.7. YOUR Project Control

It is important that you are comfortable with the steps of your project as it moves from concept to completion. In some cases a project is delegated to a project manager and it becomes a "process/time-line" abstract. For most people, the project gains an "air" or "feel" that gathers strength with progress. There is little value to a project that concludes with a result that no-one likes. Your project control is not so much a matter of the process as much as feeling that you are in control. The decisions, features, look and feel of the product are all aspects that will remain long after the design has been completed. It shocks us when we pick up projects that have been started elsewhere. More often than not, the person or company who would be in your place now has not received the understanding that we consider vital:

- a) Decisions and their implications are presented/discussed
- b) Technical issues are made accessible to all levels of ability
- c) Everyone has a valid opinion: the designers are proficient in a realm, not gurus in every aspect
- d) The client's customers are the ultimate jury in the verdict of success



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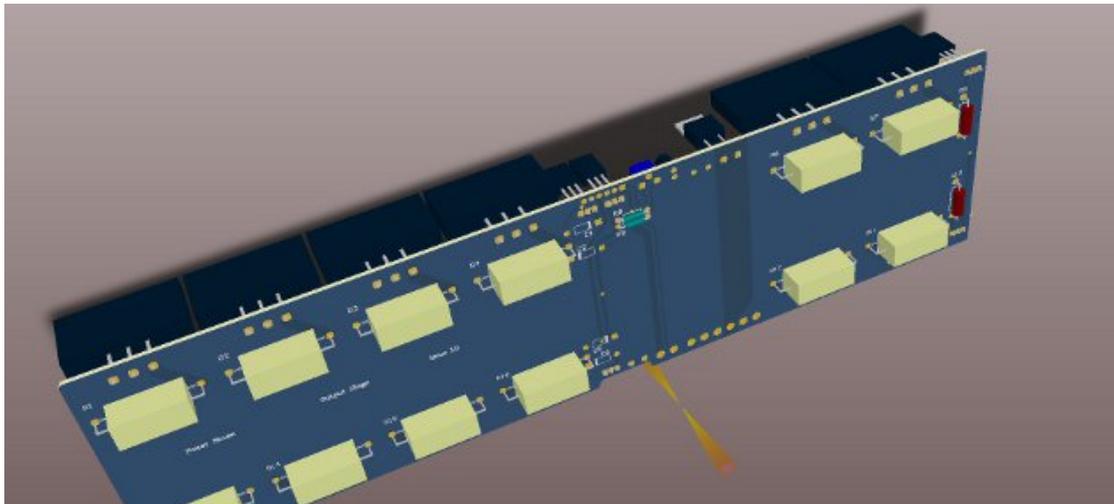
We form part of your team, not the other way round. We can assimilate, advise and proffer experience and expertise. This is an integrated process and you should be empowered to control it, even if that means the design team has to support the empowerment process.

4.8. 3D Modelling and industrial design

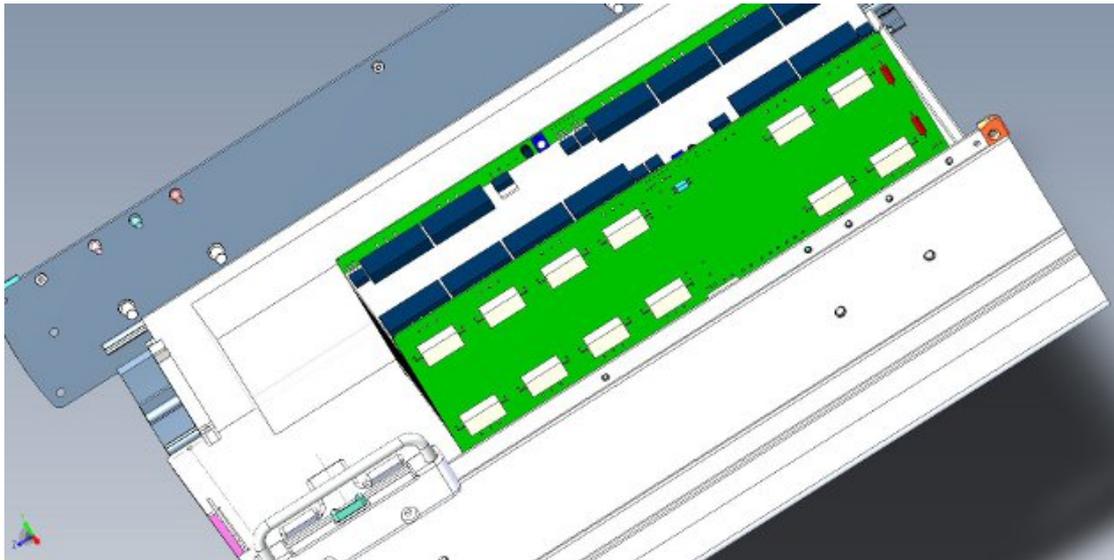
Many electronics design processes still operate in a rather 2-D fashion. In the real world of products, aesthetics and packaging the 3-D world is very important. Hawkshead has been chosen as a supplier of design in some instances based on the integration with Industrial/Product design facilities.

Modern software only provides a proportion of the solution. The remainder is an intimate knowledge of how to manage the process that allows products to be designed to fit together and be assembled in a cost effective manner.

The two images below show the benefits of up to date software combined with such knowledge.



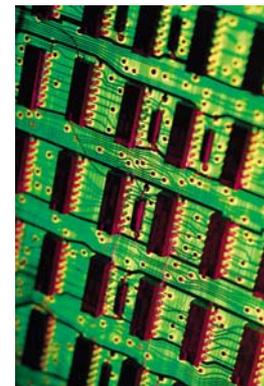
The circuit board was designed within the Altium design environment and with carefully dimensioned models "built" and applied for the components.



The integration with the Industrial Design was absolute. The design was transferred with precise mechanical data into the case work, respecting reserved areas for other structures.

4.9. Circuit board layout

Then follows the circuit board layout design. The circuit board, also known as a PCB, is the foundation on which electronic components are placed and is the basis of the electrical connections between them. The PCB and its layout have significant implications for the eventual performance of the board and therefore your product.



Depending on the nature of the project, 3D modelling and Industrial Design resources may be used to design any non-electronic parts of your product, such as casings, displays, attachments and sockets to ensure that all of these parts fit together physically and that your product can be assembled properly and will function when it is put together.

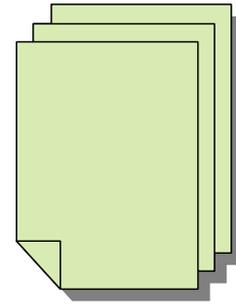
4.10. Prototype

The production of your product prototype is the first stage at which reality meets with the previous theoretical stages. Review and testing of the prototype also demonstrates errors, if any, in the electronic and mechanical design.



At Hawkshead, we aim to make the prototype as near to the final design as possible to ensure that performance measurements are realistic and to reduce the "technical risk" and cost in any further design iteration. Such is the accuracy of this work that it is possible that the prototype can be used as an early demonstration unit, however this must be considered as a bonus and not relied upon.

Compliance Testing (CE) is legally the responsibility of the manufacturer or Client Company. We aim to facilitate this process and can offer practical support and advice in the execution. It is normally outside the main design contract but is a service that can be very cost effective in reducing the number of iterations and visits to a certified test house.



4.11. YOUR Sample

In a grown-up world the concept of "play" is diminished and usually reserved for time away from work or business. Yet "play" is the most instructive form of learning and placing things in the context of the world we know.

At a basic level, the sample(s) that you receive as a result of the prototyping process demonstrate the function of the work to date. These samples verify the calculations or provide a tangible proof of some outcome. This is a very necessary and grown-up confirmation of the project.

Hawkshead is strong believer in the necessity of "play" as both a validation exercise and an inventive process. In addition to simply applying "tests" to the prototype it should be used/trialled or, if practical, taken home for others to use. It will soon become apparent if there are any opportunities to improve or add features. In some instances there may be additional "user errors" that can be trapped and avoided.

More often than not the samples show what users value and this is not always where the greatest effort is employed. In the example of an industrial audio product, the work was naturally focused on the primary function. Users anticipated the function and almost "took it as read" that it would work. Users really appreciated the lack of background noise and the clarity of the result.

These types of outcome only occur from "play" and yet they can be the underlining of product success and a foundation of future marketing.

4.12. Targeting YOUR Manufacture

A design project is only of significant value if it can be built. Some projects are a success when only 2-3 units/systems are built others move to 10's or 100's of thousands. The nature and scale of manufacture are all important.

Decades of transferring designs into manufacture in many parts of the world, leaves a rich history of experience. This is applied to your project and is naturally tied to your business strategy.

4.13. Pre-production

We can help with finding companies to mass produce your product and will liaise with the manufacturers to ensure that the end products are reliable and repeatable in terms of performance. Pre-production is always advised prior to committing to a full production run. This allows for assembly





issues and testing methods to be established. Often these products are used as sales demonstration units. Some may be offered as units to trusted customers but this again should be treated as a bonus.

In some circumstances we may be able to manufacture smaller quantities of your product in house.

Manual Writing is generally outside of the design contract, however we have the experience to either assist your manual author or to write the manual for you.

Sales Training is a step that may be inherent in the design process, depending on who generated the original concept. Often the marketing department has a primary role in the product definition and the performance criteria. The sales training that we can provide is focused on shortening the learning curve of the sales team and providing them with the confidence to be able to answer their customers' needs and questions.



4.14. It's all YOURS!

This is perhaps the most important part of all. Your ownership of a Hawkshead project is absolute on completion and final payment. You might think that this is normal but unfortunately this is not the case.

Intellectual Property Rights (IPR) are effective as a result of intellectual creativity. An author of a book is using a known process, with a vocabulary of recognised words. It is the unique order and collection of words that create the IPR. In this case the primary protection is that of Copyright.

A circuit diagram (schematic) and a circuit board (PCB) are both generated through a known process with a collection of recognised symbols and implemented with "commonly" available parts. The path to Copyright in that sense is a simple one.

We have clients who have come to us simply because they have previously failed to obtain the rights to the design for which they have paid.

Even if the case of IPR protection is not in dispute, there are many more insidious ways of "tying the client in". This is an old and underhand but highly effective mechanism: The client walks away with the design. Then there is a small change required, a component update or a subtle adjustment to the manufacture process. Only then does the client find that the capability for such changes cannot be implemented without recourse to the originating designer with fees attached.

Our goal is to design ourselves out of a job, not force you into a lock-in with us. "Why?" you might ask. The answer is very simple reverse psychology. If you are forced into a situation then the natural process is to pull away from it. Our approach means that you are free to choose.



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It is all yours... but you are not alone. We are on hand to assist with the strange queries that can arise from suppliers or to resolve the question that did not arise until much later. Most clients appreciate the security of knowing that they can come back... and 90% do with another project in hand! It is another part of the reason that we offer the 12 month post contract support and full transfer of IPR.

4.15. Onward support



We take every care in the design of your product to ensure continued supply of critical components and compliance with future needs or regulations. Unforeseen events do occasionally arise that conspire against the best laid plans.

We offer 12 months of technical support as standard and even after our formal contract has ended, we continue to provide support to our customers. If it is a small matter, such as assuring a component substitution, we often carry this out at no charge. Matters requiring significant time may require a new contract provision but the time invested in the first place will greatly reduce the risks and costs should the unforeseen occur.

5. Novelty

Any new product will contain an amount of progress. The best results are achieved by providing us with as much notice as possible of your design goals and plans. At the outset of a new range or product group there are opportunities to make cost free or minimal cost options for future features. These give you the benefit of being able to launch with a product and release improvements as your competitors try to catch up.



6. Research/Feasibility



Given the original nature of the design work carried out at Hawkshead, we are well placed to carry out work in “uncharted territory”. This means that you can explore some new technology or process, prior to committing to a full design incorporating an element of technical risk.

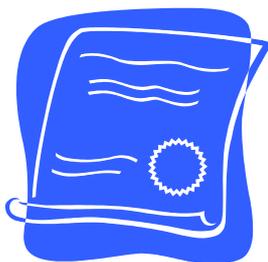
We have worked on research based equipment in the past. We are currently engaged in a project of our own that falls into this category. Research and feasibility is primarily about minimising risk and long term cost. The benefit is further advance over other products or companies and may create a technical prowess that empowers your sales team and bottom line profit.

7. Technology

Hawkshead creates designs from a blank sheet of paper. That is not to say that we will ignore prior art or your company’s hall marks. However, the ability to create designs from scratch means that collectively we can make products that no one else has previously produced. It may involve incorporation of new parts working as an early taker of new technology.



8. Patents



Although this is rare, there are occasions where the work has sufficient novelty to be patentable. This has significant implications for your company. Assuming that the work is directly related to time and knowledge acquired in the execution of your project, the patent will be assigned to you or your company.

The designer or originator is usually named on the patent but the benefit from it is based on the assignment. We assign it to you without any hold over the patent or your company.



"The choosing of our company name was obvious. "Hawkshead Designs" is taken from a combination of two surnames - Hawkins and Hollinshead.

A Hawkshead conjured up the mighty bird of prey - a creature that will stop at nothing until its task is completed. Hawk, from the Native American world, describes the bird as a messenger with strength, truth and foresight.

The logo is a Native American symbol of the butterfly. Their translation for this wondrous insect is rebirth, the soul, transformation and everlasting. This logo would seem to express (as well as my love for the butterfly) everything that our company is about.

The business is a transformation, if you like. A rebirth built on a foundation of strength, truth and possibly a smidgen of foresight."

Jacqueline Hollinshead
Managing Director

www.hawksheaddesigns.co.uk